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Briefing
B.C. Hydro - Liard hydro-electric Project

nvironmental Planning and Assessment
Department of Renewable Resources

Government of the
Northwest Territories

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B.C. Hydro - Liard River Dams

For your information:

Attached please find a brief prepared for G.N.W.T. M.L.A.'s prior to March 4, 1981 meeting with B.C. Hydro officials.

Environmental Planning and Assessment
Department of Renewable Resources
Government of the Northwest Territories

B.C. Hydro-Liard River Hydro Electric Development Proposal

Background

British Columbia Hydro and Power Authority, a provincial crown corporation, has plans to bring a number of major hydroelectric and thermal projects into production by the mid-1990's (Table 1). Of these, the most economically feasible is the Liard River Proposal. With a hydro-electric potential of 25,000 Gwh (gigawatt hours), this complex would be one of the largest of its kind in northern Canada. The proposed Liard River Hydro project would be larger than the Bennett-Shrum dam on the Peace River and the Mica dam on the Columbia River combined. The power produced would almost double B.C. Hydro's 1981 sales. It has been suggested that the power from the Liard Hydro project would be used to enhance the British Columbian economy by attracting international industrial companies, and by providing an alternative to oil and gas supplies. By mid-1980, B.C. Hydro had spent $4,000,000 on feasibility studies for the Liard River site.

Four alternative Liard dam schemes have been considered (Map 1). Scheme 2, with dam sites at Devil's Gorge and Beavercrow, would deliver the greatest amount of electrical energy, and at the lowest capital cost per unit. This alternative has been the focus of B.C. Hydro's engineering and environmental studies.

Downstream impact investigations began in mid-1979; completion dates for most of these studies are scheduled for mid-1982. Environmental aspects that have been addressed in the reservoir region and downstream on the Liard and Mackenzie Rivers include:

(1) aspects of the physical environment: climate, geology, landforms, soils, geothermal resources and hydrology;

(2) aspects of the biological environment: vegetation, wildlife, and aquatics including fisheries; and

(3) aspects of the socio-economic environment: forestry, agricultural potential, recreation, tourism and heritage resources (including archaeological sites). Engineering investigations have included the establishment and maintenance of work camps, access roads, and airfields; geophysical reservoir site surveys; and river surveys in the project area.

Issues and Concerns

General

The direct and more easily measured effects of the Liard hydro-electric project would occur upstream of the dam, entirely within British Columbia. The benefits and costs in this case are calculated by valuing the benefits from electric power generated against the direct losses resulting from flooding and related social costs.

Most impacts resulting from the Liard River hydro-electric project in the Northwest Territories would result from water flow regulation of the Liard River. Downstream effects may be significant, however these effects are more subtle and difficult to evaluate. The Liard River is the major tributary of the Mackenzie River, contributing about one-third of the total annual river flow and accounting for approximately

70 percent of spring peak flows. Effects of the Liard hydroelectric project may extend to the Mackenzie delta/Beaufort Sea.

Environmental

Significant effects on the Liard/Mackenzie water regime will be noticed during the first two years of operation while the reservoirs are being filled. Approximately fifty percent of the water flowing down the Liard River would be impounded. Once the reservoirs are filled, flows on the Liard would be controlled, substantially reducing seasonal fluctuations. Waters from the spring and summer peak flows would be used to refill the reservoirs.

Under natural conditions, spring flood waters contribute sediment for the formation and maintenance of the Mackenzie delta, river uplands, and important wildlife habitat along the Mackenzie River. This is a direct result of the Liard River increasing the mainstream Mackenzie River sediment concentration from two to sixty-fold during the open water season. The sediment load delivered to the Mackenzie delta after the Liard dam is operating would be decreased by about 10 percent (9,000,000 tonnes per year).

Once the Liard Hydro dams are in operation, spring-summer waterflows are projected to decrease by 40% in the lower Liard and by 15% at the Mackenzie delta. Secondary impacts on ecosystems, in particular aquatic habitat, would be expected. The Liard River triggers breakup in the Mackenzie downstream of Fort Simpson. A delay in spring ice breakup would occur in both the Liard and Mackenzie Rivers.

The Mackenzie River environment depends upon the warm spring peak flows generated by the Liard River to flood lowland lakes. These lakes are a major physical and biological feature of the region. Fluctuating water levels help to maintain food and habitat for moose and other important wildlife species.

The Mackenzie River is one of North America's major migratory bird flyways. Regulation and stabilization of the river regime may delay spring breakup, lower flood levels, and possibly result in loss of traditional waterfowl resting and feeding grounds. This impact may affect the western North American waterfowl population.

Social

Allocation of a water resource among any number of different uses requires consideration of how water use decisions may be made. The question of water as a strategic resource component of native land claims is an issue that must be addressed.

The secondary effects of controlled water flow by the Liard River dam may affect wildlife habitat. As a result, fishing, hunting and trapping patterns may be altered along the Liard and Mackenzie rivers and in the Mackenzie delta.

Economic

Transportation during summer on both the Liard and the Mackenzie river systems is dependent on the length of the ice-free season. Low water in critical reaches effectively terminates shipping every year. Dam regulation may further reduce water levels during the brief shipping season.

During winter, the regulation of water levels would result in a flow increase of 300% in the lower Liard and 20% in the delta. An open water reach of up to 300 km downstream from the lower damsite may persist throughout the winter, restricting over-ice travel. Higher winter flows may affect the stability of the ice cover even further downstream, affecting winter roads and transport routes.

Possible changes in resource harvesting activities will affect direct and indirect income earned from fish, fur and game.

Summary

From the environmental impact assessment work completed to date, it appears that the Liard project may impair water quality, and change seasonal water levels and volumes, as far downstream as the mouth of the Mackenzie River. Quantification of projected changes is difficult because little data has been accumulated. B.C. Hydro has stated that "it is not possible to undertake inventory and impact assessments on a well-defined and equitable basis".

Impacts of the Liard River hydroelectric project may have far-reaching ramifications on northern life. The proposed Liard hydro project must be reviewed carefully, particularly in view of other hydro projects, such as the proposed Slave River hydroelectric project.

The Mackenzie River Basin Committee was established to address planning and management concerns for water and related resources of the Mackenzie River Basin. This committee has recently released a number of recommendations relating to transboundary water management issues.

Timing is crucial. The Liard project is scheduled for completion by the mid 1990's. It is anticipated that a formal public environmental assessment and review process should take place in 1983/84. A time frame of 8-10 years is required for project construction activities related to this hydro project.

The G.N.W.T. must prepare to address the issues raised by the proposed Liard River hydro project in order to protect the interests of northern residents.

TABLE I

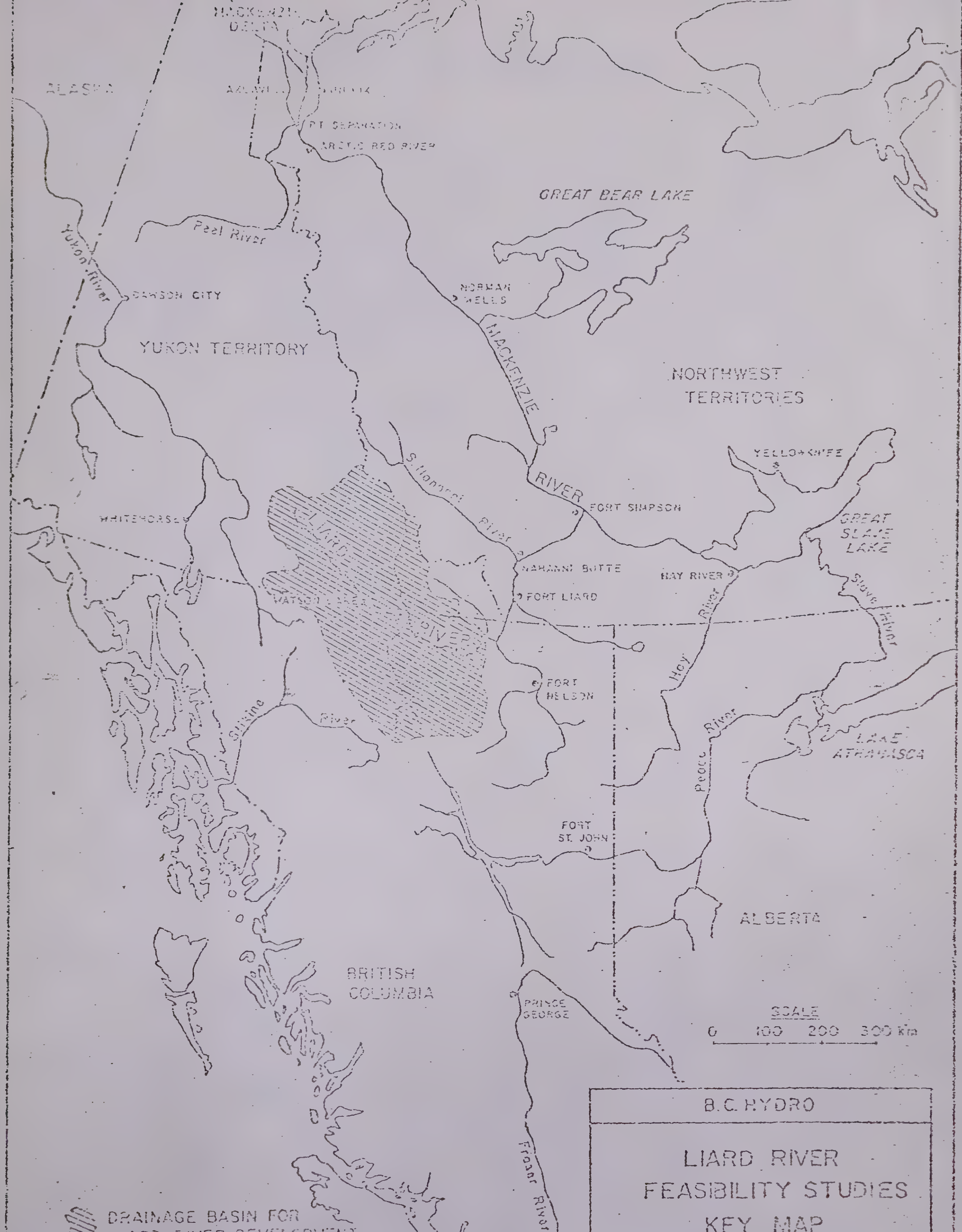
Proposed Project	Ultimate Capacity (MW)	Ultimate Annual Capability Average Energy (Millions of kWh)	Estimated Economic Rank	Years of Future Load Growth Served
Kootenay Diversion	-	810	1	0.3
Peace Site C	900	4 570	4	1.9
Alcan Purchase	780	up to 5 500	N/A	2.3
Hat Creek Thermal	2 000	11 400	6	4.8
East Kootenay Thermal	600	3 680	7	1.5
Murphy Creek Hydro	400	2 100	5	0.9
Stikine-Iskut Hydro	2 690	14 100	3	5.9
Liard Hydro	4 640	24 400	2	10.2
Revelstoke	2 700			
Projects in Operation				
Bennett-Shrum (Peace River)	2 416			
Mica (Columbia River)	1 736			
Revelstoke	450			

Note: Economic ranking takes into account the cost of fuel for thermal plants.

POSSIBLE SEQUENCE

Project		
Oct. 1987	Peace Site C	Earliest in-service; flooding of some agricultural land.
Oct. 1989	Murphy Creek	Feasibility to be established this year; project would involve relocation of homes and service facilities in Castlegar area.
Oct. 1989	Hat Creek Thermal	2000 MW plant. Uncertainties related to air emission regulations.
Oct. 1991	Stikine-Iskut Hydro	Earliest in-service date. Project now under study; impact on scenic value of Stikine Canyon.
Oct. 1994	Liard Hydro	Now under study. Requires solution of native Indian claims; probable flooding of Liard River Hotsprings Provincial Park and problems with proposed gas and oil pipelines from Alaska.

(from B.C. Hydro bulletin)
October 1981.



(From B.C. Hydro bulletin)
July 1981

TENTATIVE TIMETABLE FOR LIARD HYDRO PROJECT

1978	1982	1984	1998
Project overview completed.	Feasibility studies to be completed.	earliest possible	probable
Engineering feasibility and environmental impact studies commence.	Preliminary design costs determined. ↓ CERTIFICATE APPLICATION ↓ PUBLIC HEARINGS begin ↓ CONSTRUCTION begins.	POWER GENERATION	

Statutes that may apply to Liard Hydro Project

Federal Statutes:

- The Navigable Waters Protection Act
- The Fisheries Act
- The Indian Act
- The Northern Inland Waters Act
- The Dominion Water Power Act
- The International Rivers Improvement Act
- The Canada Water Act
- The Pollution Control Act

Provincial Statutes:

- The Utilities Commission Act
- The Water Act
- The Agricultural Land Commission Act
- The Heritage Conservation Act
- The Park Act
- The Environment and Land Use Act

Note: This list is not exhaustive.

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